

PRE-COURSE ACTIVITY

Model Enforcement Approaches

Purpose

Evaluate a local jurisdiction's approach to building and fire code enforcement.

Directions

1. Complete three assigned pre-course readings:
 - a. Introduction to Code Administration and Enforcement.
 - b. The Makeover.
 - c. NFPA 13, 2022 edition changes from SprinklerAge210910-2.
 2. The pre-course reading, Introduction to Code Administration and Enforcement, describes a model code administration and enforcement approach in the U.S. It summarizes legal authorities and responsibilities, codes and standards, and the permitting and appeals processes.
 - a. In 500 words (roughly 1 page) or less, compare and contrast your jurisdiction's code enforcement process to the readings. Where is your system better or worse? Why do you think that? Where can you make or recommend improvements?
 - b. You will submit your paper to the instructor(s) on the first day of class.
 - c. Be prepared to briefly summarize the compare and contrast portion of your paper as part of your personal introduction on the first day of class.
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***INTRODUCTION TO
CODE ADMINISTRATION AND
ENFORCEMENT***

Introduction

“A law is effective only to the extent that it is enforced, and so it is with a fire prevention or building code. Many serious building fires have been the result of, not of code deficiencies, but of lax enforcement (sometimes because of corruptions). A fire resistant floor, for example, is an insufficient barrier to smoke and fire if the architect allows gaps in the floor or a workman punches a big hole in the floor to allow a pipe to pass through. Vigilance is needed in the review of plans and in inspection during construction. Once construction is finished, compromises in fire safety may be hidden from view.

The training of inspectors is, in many places, woefully inadequate. In one major city, the only training for fire prevention inspectors consists of sending them out for a few days with a senior inspector. Architects and engineers complain about inflexibility in codes, but one reason codes toward rigidity and detailed specifications is that local building officials and inspectors are not equipped, because of the inadequate training, to evaluate alternative solutions and tradeoffs.”

New thoughts and recent statements on the foregoing statement were contained in “America Burning, The Report of the National Commission on Fire Prevention and Control” published in 1973!

This is not the first time a governmental study recognized issues with building and fire code enforcement. The President’s Conference on Fire Prevention in 1947 stated:

In brief, the committee recommends that greater attention be given by designers of buildings to recognized standards of construction and strict compliance to established codes and regulations; that governmental officials review the adequacy and extent of existing regulations; that owners and managers of buildings adhere to safe practices and observe standard rules of fire safety; that aggressive action be taken to accelerate the installation of automatic fire protection in new and existing buildings, particularly where safety to life is a compelling factor; that designers, owners, public officials, and the public in general assume their full obligation for the elimination of fire hazards.

Among the recommendations set forth in “America Burning” were:

43. The Commission recommends that all local governmental units in the United States have in force an adequate building code and fire prevention code or adopt whatever they lack.

44. The commission recommends that local government provide for competent personnel, training programs for inspectors, and coordination between various departments involved to enforce effectively local building and fire prevention codes. Representatives of the fire department should participate in reviewing fire safety aspects of plans for new building construction and alterations to old buildings”

The lives and property of everyone in a community can be threatened by fire. Therefore, everyone can (and should) play a role in fire prevention. The head of a household who decides to buy (or not to buy) a smoke detector; the child who has learned (or has not learned) what steps to take if his or her clothing catches fire; or the restaurant patron who makes a point of checking exits in a crowded establishment before enjoying a meal are undertaking (or not undertaking) fire prevention activities.

Within the fire department, the duties related to fire code enforcement, public education and fire investigation are functional areas that embody complex and detailed activities and may well involve close ties with other local government agencies.

Benefits of a Code Enforcement System

Until the twentieth century, building conditions in the United States were marked by excessive use of highly combustible materials put together without much regard for protection of life or property from fire. Large individual buildings housing vast combustible stocks under one roof, lack of firewalls and vertical cutoffs, wood shingle roofs, and other unsafe factors that contributed to rapid spread of fires were characteristic of the American scene. In many parts of the United States, seasonal droughts and high winds aggravate fire conditions and result in area conflagrations that contribute substantially to the overall high national fire losses. Jurisdictions which invest more in prevention activities have a relatively low threat of fire incidence.

A good code enforcement system:

- Reduces risks of hazards.
- Provides improved fire-safe structures.
- Reduces fire exposure, when a fire does occur.
- Minimizes fire death and injuries.
- Reduces hazards for firefighters, when a fire does occur.
- Controls inherent hazards that cannot be eliminated.
- Reduces workload of firefighters.
- Promotes a more stable community (jobs, confidence, trust, etc.).
- Minimizes property loss (money).
- Minimizes fire insurance costs.
- Improves image of community.
- Maintains/Improves community's economic structure.
- Increases community awareness of fire safety.
- Makes code enforcement easier (previous hazards violations).
- Balances the cost of fire protection between the public and the private sector.

It is accurate to say that effective enforcement can be enhanced through the knowledge of your community's makeup. In today's society, the role of the code official is no longer viewed as an isolated function, but is becoming more active and involved everyday.

Code Enforcement — Where does it begin?

Code enforcement begins with code application during the review of plans and specifications to assure compliance with fire safety features of the building and fire prevention codes; control of structures through inspection to assure proper exits, interior finishes, fixed fire protection equipment, and other related features; control of occupant capacity and smoking regulations; and control of sales and use of materials and equipment. The last function includes control or limitation of the storage, handling and use of explosives, fireworks, flammable liquids and gases, and other hazardous materials.

Within a given jurisdiction, building and fire officials must cooperate fully if they are to obtain their goal of enforcing both the fire prevention/building codes for effective community fire safety. This effort must consist of **communications, cooperation and coordination**.

Fire Protection-Life Safety Requirements

A fire prevention code is a document regulating the storage, handling, production and use of hazardous materials. The fire prevention code sets the requirements for testing and maintaining fire suppression and fire detection systems, regulating general fire safety requirements, and maintaining life safety features within a structure. It also authorizes the fire department to assume responsibility for inspection, code enforcement and code administration duties.

The purpose of a fire prevention code is to provide reasonable protection of life and property from the hazards of fire and explosive materials. Fire codes exist to minimize hazards to life and property from fire and panic, exclusive of those hazards considered in building code regulations.

Section 101.3 of the 2015 edition of the “International Fire Code” (IFC) states:

The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

Section 1.2 of the 2015 edition of the National Fire Protection Association (NFPA) 1, *Fire Code* provides:

The purpose of this *Code* is to prescribe minimum requirements necessary to establish a reasonable level of fire and life safety and property protection from the hazards created by fire, explosion, and dangerous conditions.

The annex for this section goes on to state: “Consideration for life safety could include occupants, fire department personnel, fire brigade members, employees, responsible parties and the general public.”

A building code is a document that establishes the building requirements necessary for the protection of public safety, health and welfare. Approximately 75 percent of building codes are directly related to fire protection and life safety concerns. The scope of these codes addresses all matters pertaining to the construction of new structures, additions, alterations, remodeling or the change of use of an existing structure. This includes all permanent or built-in fire protection equipment and other safeguards, such as firewalls and separations.

Section 101.3 Intent of the 2015 edition of the “International Building Code” (IBC) states:

The purpose of this code is to establish the minimum requirements to provide a reasonable level of safety, public health and general welfare through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributed to the built environment and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

LEGAL AUTHORITY

THE FEDERAL BASIS OF CODE ENFORCEMENT POWER

The U.S. Constitution and Governmental Power

The authority to enforce laws is among the governmental powers contained in the U.S. Constitution. This power has come to be known as police power. It is defined as the power to restrict personal freedom and the use of property in order to preserve peace and to protect public health, morals and welfare. In other words, the government can coerce individuals to do (or cease doing) things against their will if it is in the interest of public welfare. Fire safety is considered a public welfare issue because fires are an obvious threat to life and property. Therefore, the power to enforce fire codes is considered to be a police power.

The framers of the U.S. Constitution then had to craft an instrument that allowed for a split sovereignty, a way for both the federal government and the individual states to have their own governmental powers. The only acceptable means they found was to specify the specific powers reserved for the president, the Congress, and the Supreme Court, and allow the states to enforce any governmental powers that the federal government did not reserve for these three federal branches. The 10th Amendment was added to the U.S. Constitution to make it explicit that it granted all authority to the states to govern not expressly reserved or prohibited by the U.S. Constitution:

“The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.” — The 10th Amendment to the U.S. Constitution.

Constitutional Limitations on Police Power

The U.S. Constitution is a general statement of the governmental power that the nation's founders gave themselves, with the ratification of the citizenry. Since its adoption, several amendments have been approved which spell out the limits or scope of the original language. The limits to police power have been addressed in the Fourth and 14th Amendments. The Fourth Amendment limits the power to search private homes. The 14th Amendment states that no person can be deprived of life, liberty or property without due process of law or the equal protection of the law. In addition to these constitutional amendments, the limits to police power have been interpreted by the U.S. Supreme Court. This section will focus on the impact that the amendments and Supreme Court decisions have had on code enforcement.

Most inspections are routine. That is, the code enforcement official decides to inspect a particular property because it is next on the schedule, not because he or she received a complaint or suspects a code violation. Regarding this practice, two U.S. Supreme Court decisions are notable because they have limited a code enforcement official's use of police power to enter private property when there is no probable cause to suspect a violation. In *Camara v. City of San Francisco*, the city convicted Camara for refusing to allow a housing inspector to enter his apartment to conduct an inspection. Camara appealed, but the appeal was denied up through the California Supreme Court. Camara then appealed to the U.S. Supreme Court, claiming that his conviction was based on a violation of his rights under the Fourth Amendment to the U.S. Constitution, and therefore was invalid. The Fourth Amendment states that a person's right to privacy in his or her own home includes protection from warrantless search and seizures. The U.S. Supreme Court reversed Camara's conviction, stating that the housing inspector should have gotten a warrant to inspect the apartment when Camara refused entry.

In the case of *See v. City of Seattle* (1967), the U.S. Supreme Court dealt with the same Fourth Amendment issue, but this time the court expanded the definition of privacy in a dwelling to include the **private** part of a business property (that area of the business not open to the public). The city of Seattle convicted See for refusing to allow a Seattle code enforcement official entry into his locked warehouse to conduct a routine inspection. The State courts upheld the conviction up through the Washington Supreme Court, and See appealed to the U.S. Supreme Court that the conviction was a violation of his Fourth Amendment rights. The court reversed the conviction, stating that the reasoning in the decision in *Camara v. City of San Francisco* was applicable to parts of businesses that are not open to the public.

Because of these two U.S. Supreme Court decisions, code enforcement officials can no longer employ police power to inspect private dwellings and parts of businesses that are not open to the public. The U.S. Supreme Court has compared the constitutional authority of police power with the constitutional right to privacy, and has concluded that the constitutional right to privacy outweighs the inspector's right to enter those occupancies, unless a search warrant has been issued. A condition of the warrant is that the code enforcement official must show probable cause that a fire code violation exists.

The U.S. Supreme Court decisions did not leave inspection officials with no recourse. In the *See v. Seattle* decision, the court noted that jurisdictions could still enter these types of occupancies at reasonable times without a search warrant if the inspection were required to satisfy the conditions of a license. If, for example, a city requires business licenses, it could add the requirement of passing an annual code inspection as a condition of receiving and continuing the license.

A similar method has been used for certain residential occupancies in some areas of the country. Jurisdictions have created licenses for rented residential property (both single-family dwellings and apartment buildings) that require an annual fire and health inspection as a condition of the license.

Methods for Adopting Building and Fire Codes

Governments have two methods of adopting a model code. The first is **transcription**, where the government enacts a regulation that literally copies the entire model code into the regulation and places the jurisdiction's title on it in place of the model code title. The other method is to adopt the model code by **reference**. With the reference method, the jurisdiction adopts a short regulation stating that the model code in question is legally enforceable as the jurisdiction's fire safety regulations. Jurisdictions using the transcription method must print copies of the code for people to use.

The reference method is more popular because the code books are available from the model code organizations. Another reason for the popularity of the reference method of adoption is its efficiency. Some states add amendments to the model code, for example the deletion of a specific chapter or the addition of more stringent requirements. But for the most part, the model fire codes provide a complete set of fire safety requirements that will apply to situations found in every jurisdiction. The model codes have two other distinct advantages. They have a broad base of support (i.e., dozens of states, and the large number of adopting jurisdictions increase the confidence that the codes in question are reasonable). Also, the model code organizations publish revised editions; this provides for regular improvements to existing requirements, as well as the timely adoption of requirements that apply to new materials or processes. If each state were to create its own agency to perform this regular updating and introduction of new topics, it would create a great deal of redundant actions that would not have the broader base of support afforded by the model codes.

Although the model code option is the most frequently used of the options noted, states still have additional statutes or regulations regarding fire safety. The statutes might address an issue that is peculiar to the state and not adequately dealt with in the model code. Or, a statute might enact more stringent measures on a specific fire safety issue than are found in the model codes. Two examples are sprinkler requirements and the definition of a high-rise building. Many states have enacted statutes or regulations that require sprinklers in certain occupancies that are not required in the model codes. Some of these sprinkler requirements are retroactive, where the model code requirements are not unilaterally retroactive. Also, some states have amended the definition of high-rise buildings in the model codes by lowering the building heights that define high-rise buildings, thus applying their model code's high-rise fire protection requirements to more

buildings. For example, the state of Michigan defines a high-rise building as one greater than 40 feet in height. Thus, a building taller than 40 feet would require the same fire protection features that are called for in the two model codes used in Michigan, even though one of the model codes uses 75 feet to define high-rises and the other uses 55 feet.

Mini and Mini-Max Codes

States that adopt a statewide fire code do not necessarily make it the exclusive fire code for their local governments. Where this is the case, local governments can elect to use the state fire code or enact their own. But some states add a provision to their adopting language that prohibits local governments from adopting fire codes that are less stringent than the state code. In states where this is the case, the state fire code is called a mini code.

A number of states go further than the mini limitation and add a maxi limitation as well. This limitation can take two forms. The limitation may state that local fire codes cannot be more restrictive, or the language provision can state that local jurisdictions cannot adopt regulations that differ from the state code. Both forms of the limitation will effectively make the state code both the minimum and maximum fire safety requirements, since another fire code could only be different by containing requirements that were less restrictive or more restrictive than the state fire code. Where this type of limiting provision is used, the code is called a mini-max code.

The mini-max concept is a little difficult to explain because it is not an explicit feature of a code. Rather, a code becomes a de facto mini-max when certain restrictions are placed upon the jurisdictions using the code. To make a code a mini-max, the jurisdiction does not state that “this is a mini-max code.” Rather, the jurisdiction states something like “No one in this state may adopt a fire code, ordinance or regulation that differs from this code.” This type of statement makes the adopted code a mini-max because no one can adopt anything either less stringent or more stringent than what is in the adopted code.

Local sprinkler requirements are an example of these limitations. If the state mini-max code says that sprinklers are not required in retail occupancies unless the occupancy is larger than 12,000 square feet, a local jurisdiction could not enact an ordinance that requires sprinklers in these buildings over 10,000 square feet. This ordinance would be more stringent than the state code. Thus it would differ from the state code and be illegal. The same goes for an ordinance that might be less restrictive than a state code requirement.

Training Education

When adopting one of the model codes, the code groups will provide training and certification for both building and fire code inspectors. Whatever code is to be adopted must be followed with the required training of inspection personnel before they are allowed to enforce the code requirements in the community.

CODES AND STANDARDS

Codes

Codes are mandatory provisions using the word **shall** to indicate requirements and are in a form generally suitable for adoption into law. They set forth minimum requirements to protect the health and safety of society and generally represent a compromise between optimum safety and economic feasibility. Codes are written in legally adapted language and are intended to be adopted by the authority having jurisdiction (AHJ) into the local or state statutes. There are two types of codes:

- Prescription (formally called Specification) — Spell out in detail what materials can be used, the size of components and how they are to be assembled.
- Performance — Detail the objective to be met and establish criteria for determining if the objective has been met.

Standards

Methods and materials can be selected as long as it can be shown that the performance criteria can be met. Performance-oriented codes still embody a fair amount of specification-type requirements but the provision exists for substitution of alternate methods and materials if they can be proven adequate “trade-offs.” Standards are mandatory provisions using the word **shall** to indicate requirements. Requirements found in codes are excerpts from, or based on, the standards published by nationally recognized organizations. The most extensive use of standards is their adoption into the code by reference, thus keeping the code to a workable size and eliminating duplication of effort. Examples of such standards are those that deal with:

- Extinguishing systems.
- Flammable liquids.
- Hazardous processes.
- Combustible dusts.
- Building materials.
- Water systems.
- Mechanical systems, etc.

It should be noted that there are a number of NFPA documents which carry the name “code” but are enforced as “standards.” These include the NFPA 72, *National Fire Alarm and Signaling Code*, NFPA 70, *National Electrical Code*[®], and NFPA 30 *Flammable and Combustible Liquids Code*.

Recommended Practices

Recommended practices are only advisory provisions (using the word “should” to indicate recommendations) in the body of the text. Should indicates a recommendation which is advised but not required. They are published by nationally recognized organizations and are intended to deal with maintenance and operational standards for the various systems required by the code. Recommended practices can be adopted into the code by reference and used by the AHJ as guidance in a particular situation or the provisions of a recommended practice can also become mandatory, essentially changing the “should” to “shall.” As an example, your local adoption states that the protection of buildings from exterior fire exposure shall be in accordance with NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*.

Guides

Guides are advisory in nature and may give instructions, but do not contain mandatory provisions. They are written by nationally recognized organizations. Guides are intended to explain the codes’ and standards’ written intent. Guides provide methods to the AHJ or testing agencies to assess the degree to which the system has met the intent of the standard.

Guides are not adopted by reference, but can be included in a standard. Guides can also be considered to the “standard of care” for a particular activity or process.

Nationally Recognized Standards

All of the code documents require certain types of construction methods, materials and equipment. In most jurisdictions, “approved” means “acceptable to the AHJ.” Most code enforcement officials do not have the facilities or expertise to conduct the testing necessary to assure that the construction methods, materials and equipment meet the code requirements. Instead they rely upon outside testing and listing organizations. There are numerous testing and listing laboratories in the United States. Three of the most well known are Underwriters Laboratories (UL), Factory Mutual Research Corporation (FM), and Southwest Research Institute.

Also mentioned in the model codes are testing criteria or standards. Some of these standards may be from UL or FM. Others come from additional standards organizations.

The American Society for Testing and Materials (ASTM) has more than 140 standards writing committees and produces voluntary consensus standards for materials, products, systems and services. The standards written by ASTM are consensus standards, developed by ASTM committees, and are subject to approval by the membership. Quite often, ASTM, UL and NFPA will have identical standards criteria.

The American National Standards Institute (ANSI) writes no standards of its own, but approves standards written by other organizations. One of the criteria for this approval is that the standards be developed under an open process that gives directly and indirectly affected interests an opportunity to express their views.

The American Petroleum Institute (API) represents those individuals and companies involved in the petroleum industry. The institute writes several standards concerning the storage and handling of flammable and combustible liquids.

Code Reference Materials

It is essential that adequate copies of the adopted codes, by edition, be available for use by all inspection personnel. Copies of other standards, by edition, that are referenced by the codes must also be available.

Authority Having Jurisdiction/Code Official

In most jurisdictions, there are individuals designated as the one legally responsible for enforcing the provisions of the building and fire codes. These persons are referred to as the AHJ or the code official.

The code official (AHJ) is the administrator and the code enforcement officer who is responsible for:

- Applying and enforcing code requirements.
- Conducting the necessary inspection to determine code compliance.
- Determining alternate methods of satisfying the intent of the code.

PERMITS

Permits normally bring about code enforcement. A permit may be required to conduct a specified business or operation. The lack of a permit constitutes a violation of the fire code and the project/process can be shut down. Know how establishing a permit program might conflict with other agencies, departments, or divisions.

This permit system is a method of dealing with and controlling hazardous conditions and operations. The permit requires that recognized practice, as laid down in technical sections of the codes or standards, be complied with. In this way, the code enforcement agency gains control or limits hazardous activities (welding, spray painting, etc.).

The purpose of a permit is to require that fire hazards be brought to the attention of the bureau so that an inspection can be made to ensure compliance with code requirements. This permission shall not be construed as a right to violate any provisions of the code.

Many local communities have established fees for the permits that are issued. These charges should be in an amount that offsets the cost of the community for the time and resources required to approve the permit.

COMPLIANCE

Within the purpose, scope or enforcement authority of the building or fire codes, is the word “compliance” mentioned? We assume that if we do not note any violations of the code, then the building is in compliance with the code. The word compliance means the act of conforming, or being in accordance with. Your duty as an inspector is to inspect for the purpose of ascertaining and correcting conditions that are in violation of the code provisions or the intent of the code. If you state that a building is in compliance with the code, what does that mean? Is the building 100 percent, 90 percent or 50 percent in compliance? You really have no way of determining compliance unless you were involved in the site inspection of the building during all phases of construction.

An example of this would be if you are inspecting an existing restaurant that has a fixed ceiling in place around a grease exhaust duct. How would you know if the required clearances between the duct and combustible construction have been provided when there is no attic space that would provide access? This condition could only have been determined during the construction and installation of the duct itself. Would it be reasonable to require that the ceiling around the duct be removed to determine if the clearance had been provided?

Your duty as an inspector is to determine if the building, conditions, or process meets or is in accordance with the intent of the code requirements. To do this, the inspector has to have an understanding of what the code requirements are intended to accomplish (i.e., “whys” of the code, not just the written word). Getting violations corrected can be accomplished when the “whys” of the code can be explained. Knowing the “whys” or the intent of a given requirement will enable the inspector or the AHJ to determine if an alternate method or material could be used that would meet the intent of the code.

DOCUMENTATION

It is the responsibility of the inspector to have all of the hazards, no matter how small, corrected. All such hazards should be documented for the inspector’s report to provide a complete record of all conditions found.

If violations are not documented, the department may be charged with negligence if a fire should occur and no records have been made of the request for abatement of a violation.

Reports are an important element in the operational procedure of an effective code program. The ability to enforce the code properly, to apply the code uniformly to all parties, and to defend successfully all enforcement actions centers on a good recordkeeping system. Accurate records of violations may act as indicators for the enforcement program. When records are evaluated

properly, they may show trends and provide you with the basis upon which your enforcement program can be adjusted to meet the changing requirements. By accurately documenting violations, a chronological listing of previous inspections can be used.

Code enforcement documentation can be in several forms. In addition to inspections being conducted and violations noting required corrective actions, documentation is also required for:

- Detailed building and occupant information.
- Permits issued.
- Complaints.
- Consultations.
- Plan review comments.
- Acceptance testing of fire protection equipment and systems.
- Approval based on alternate equivalent methods, based on intent of code.

Most documentation by an inspector will be related to inspections, reinspections, violations noted, corrective actions required, and violations corrected or removed. This documentation will be in a written format that uses either preprinted forms or written inspection reports. When writing an inspection report, remember that legal actions are often won or lost on the basis of the written reports and records.

When writing a report, keep in mind that:

- Reports that are based on conjecture or derived from uncertain and questionable sources must not be used.
- Acceptable grammar should be used.
- A well-prepared report indicates that the inspector has the knowledge and has developed the experience to conduct a valid inspection and present it in an acceptable form.

Each violation listed on the report must:

- Describe in detail the specific violation noted.
- State what the code would require, and describe the corrective action that has to take place in order to meet the code requirements.
- Provide the code references, including the edition, and sections numbered.

Remember that the accuracy of the report cannot be overemphasized. It is a legal document and may be used by several different legal representatives. Code enforcement officials who write inaccurate, sloppy or incomplete reports may leave themselves, their departments or their city open to possible legal ramifications.

THE APPEALS PROCESS

The purpose of the appeals board is to answer questions of interpretation and application, as well as to evaluate equivalencies. It is not the purpose of the appeals board to waive code requirements.

The board shall adopt reasonable rules and regulations for conducting its hearings. All proceedings shall become public record. The board may also require a fee for this hearing. The board should consist of members who are qualified to rule on matters pertaining to fire protection and fire prevention.

The city or county attorney also should be an ex officio member to address legal matters or potential conflicts of interest. The members should address incorrect or unreasonable decisions, and grant variances from strict interpretations of law which would result in undue hardship.

The inspector must be aware that his or her administratively issued notices of violations or corrections may be appealed through the appeals process established in the adopted fire codes. Usually notices of corrections that involve an emergency condition are not subject to appeal.

Code Official/AHJ

In most cities or states, the code official/AHJ will have formal and informal hearings (on the record, off the record hearings).

The informal hearing is a nonrecorded proceeding in which the property owner may request a hearing to determine if a solution can be worked out without going to the board of appeals or to court. The property owner may submit documents in an attempt to correct the deficiencies or to submit equivalencies that would meet the intent of the code.

The formal hearing is a record proceeding. It uses many of the same legal techniques involved in any court hearing.

- Testimony under oath.
- Subpoenas.
- Transcripts.
- Affidavits.
- Cross examinations.

Again, as in the informal hearing, the property owner/business owner still may wish to go to the board of appeals or to court.

Creating an appeals board can be fairly simple, since each of the model codes contains a section on appeals boards and the appeals process. If a jurisdiction prefers the language in its model code, it can select members for the board per the code. If a different method of organizing the board is preferred, then the jurisdiction can either amend the model code language or delete the entire section and replace it with the preferred requirements. It can select members for the board per the

code. If a different method of organizing the board is preferred, then the jurisdiction can either amend the model code language or delete the entire section and replace it with the preferred requirements.

State Fire Marshal

In those states that have state fire marshals (48 of the 50 States), jurisdictional contexts with both authoritative and cooperative power relationships will be found between the state fire marshal and local fire officials. The state fire marshal has the authority to enforce the state fire code in any jurisdiction, but the mini code authorizes local governments to enact their own fire codes as long as they are not less stringent than the state fire code. The cooperative power relationship arises because the state fire marshal adopted the practice of enforcing the state fire code in unincorporated areas of the state where a local official has not taken that responsibility.

Another aspect of the state fire code, however, introduced a potential for conflict between the state fire marshal and local code enforcement officials. Part of the state fire code is a statute that requires the state fire marshal to inspect all schools and health care occupancies in the state, and the statute does not provide for situations where there is a local code enforcement official enforcing a local fire code. The state fire marshal/local code enforcement official power relationship is cooperative regarding this overlap in that the state fire marshal has opted to confer with local officials to resolve conflicting orders or interpretations, but the state legislature also gave the state fire marshal some specific authority that can change the power relationship to authoritative.

The state legislature enacted another statute that allows an appellant in the local fire code appeals process to continue the appeal to the state fire marshal if the appellant feels that the local appeals board erred in its interpretation of the fire code. The statute states that appellants can appeal a local fire official's orders to the state fire marshal, who can overrule the local fire official if he or she determines that the local appeals board did, in fact, misinterpret the code, only until an appeal is filed. Then the context is authoritative.

Necessary Interpersonal Skills

The inspector's ability to enforce the code within their community will depend greatly on interpersonal skills. These skills will be enhanced greatly if the inspector has the ability to explain the intent of what is being required rather than stating that it is required by the code. Remember, for effective communication to take place, the receiver must be able to fully understand the sender's message. You, as the inspector, can be either the sender or the receiver. The ability to communicate is a personal skill that is essential for effective code enforcement.

Fire Safety Salesperson

Being able to sell fire safety is essential. Without this, a good code enforcement program will fail. Using the media to accomplish this is necessary. Sometimes bad press can be used to show the necessity for code enforcement. After a major fire, use the media to explain the reasons behind the fire's spread, the combustible materials, the large unprotected areas, the open vertical shafts, or that fire protection equipment was not maintained. Unfortunately, a disaster is an excellent opportunity for the fire department to make recommendations for improvements in the community and to show the relevance of code enforcement.

Barriers to Effective Communications

Effective communication also involves the inspector's ability to deal with the general public. The inspector must recognize that there are many barriers to effective communication. These barriers can lead to misunderstanding. The inspector must recognize and overcome these barriers. Some of these barriers are:

- Mannerisms in speaking and responding that turn people off.
- Attitudes, behavior, and assumptions that allow misunderstanding and undermine our ability to deal effectively with others.
- Not showing respect for those who differ with us and those who may know less than we do.

Improving Communication

Building improved communications can be accomplished by:

- Building your self-esteem.
- Building your self-confidence.
- Helping a person to save face.
- Making concessions when justifiable (admit when you are wrong).
- Keeping an open attitude toward another person or idea (be open minded).
- Minimizing objectionable aspects of another person's ideas, and building on the positive aspects if possible.
- Helping to clarify another person's thinking.
- Taking the time to see and understand another point of view.
- Giving credit where credit is due.
- Telling others in advance about changes that will affect them.

INSPECTOR'S STANDARDS OF BEHAVIOR

The inspector's attitude is important and should be a positive one. If the inspector is critical, he or she can expect little or no cooperation from the building owner or manager.

Negativism will reduce the effectiveness of code compliance.

The professionalism of the inspector will assist in getting the job done. Knowing how to question someone about a problem without causing undue stress on the building owner or manager will make the inspector's job easier and make the inspector more efficient. To reflect the proper image for himself or herself, as well as the department, his or her closing interview and report should recommend/identify corrective action to be taken without opinions or biases; don't sacrifice accuracy and completeness.

Department rules and regulations usually address the rules of conduct. However, in public, the inspector must conduct himself or herself as a professional — friendly and polite at all times. Remember, it costs nothing to be polite.

Your organization's image can be based solely on your conduct of behavior and attitude when conducting an inspection.

CODE OF ETHICS FOR FIRE PREVENTION

Ethics is the code of morals of a particular person. Honesty, justice and courtesy form a moral philosophy.

One of the underlying purposes of codes is to see that general fire safety is observed. These laws have established correct procedures and proper rules of conduct. If an individual's rights are not respected to the fullest extent of the law, then the code can be declared null and void. When we develop the inspection program, we must include the traits of leadership: honest motives, correct attitudes and practical wisdom. Deep down, we need principles to guide us during the discharge of our duties. We must maintain our integrity and discharge our duties with fairness and impartiality at all times. We must avoid any association with enterprises of questionable character.

Questions and conditions arise from time to time regarding what may or may not be ethical. Many states and local communities have, by law, established ethical standards that must be followed by government employees during the course of their employment. We may have established our own personal ethical behavior that relates to our own moral standards. The following questions may be used when determining if a decision on an action you are about to make or take is an ethical one:

- Do I feel embarrassed/guilty?
- Do I object to my decision being published?

- Am I willing to risk criticism for my decision?
- Could I justify and defend my decision to my greatest critics and enemies?
- Have I considered everyone who will be affected?
- Does it feel right?

***Code of Ethics for Fire Marshals**

On May 17, 1966, the Fire Marshals Association of North America adopted a code of ethics. The code established conduct for the fire marshal's professional life, relations with employees, relations with other fire marshals, and relations with the public. The code of ethics for relations with the public, as published by the Fire Marshals Association of North America section of the NFPA, is as follows:

RELATIONS WITH THE PUBLIC

The fire marshal will endeavor to extend public knowledge of fire protection and will discourage the spreading of untrue, unfair and exaggerated statements regarding fire protection. He will avoid any endorsement of any specific product, trade name or company.

He will have due regard for the safety of life and health of the public and employees who may be affected by the work for which he is responsible.

He will express an opinion only when it is founded on adequate knowledge and honest conviction while he is serving as a witness before a court, commission, or other tribunal.

He will not issue *ex parte* statements*, criticisms or arguments on matters connected with public policy which are inspired or paid for by private interests, unless he indicates on whose behalf he is making the statement.

He will refrain from expressing publicly an opinion on a fire protection subject unless he is informed as to the facts relating thereto.

He will act with fairness and justice with the public when dealing with fire protection. He will never act officiously or permit personal feeling, prejudices, animosities or friendship to influence his decisions.

*Reprinted with permission from Fire Marshals Association of North America 1990-1991 Directory, Copyright© 1990, National Fire Protection Association, Quincy, MA 02269

*He will disclose no information concerning the business affairs or technical processes to the public without their consent.

MAINTAINING A LIBRARY SYSTEM

Identify and Select Priorities

It is vital that a code enforcement agency establish its own library. While the training bureau may have an excellent collection of training and research manuals, very few have the material that is necessary for proper code enforcement or for researching the various needs of the agency.

Code, Standards, Local Ordinances

First on the priority list should be all of the old code editions, local ordinances and standards that were adopted by the local political body. These documents are necessary for research when an inspection has been conducted and violations have been found. With these codes and standards, a review can verify if the building was built according to the code that was in effect at the time of construction. New codes have provisions addressing existing buildings at the time of adoption of the latest edition of the code. The building may have continuous use or occupancy continued if it was legal at the time of construction or the continued use is not a danger to life or safety.

Over the years, various changes in the building codes have required the inspection bureau to do a record and code check of existing buildings to verify that their use and occupancy are in compliance. In many cases, when there is a fire or other emergency, the first things investigators and attorneys look at are the codes, standards and regulations that were in effect at the time of construction. If remodeling was done, did the repairs or alterations made at the time the work began meet the requirements for the construction (not necessarily the entire code)? Why wasn't the building required to conform to the requirements of any new construction codes that were in existence at that time of alterations?

The current editions of the codes and ordinances should also be a part of the library. These should be in addition to the copies assigned to the code enforcement officials or the plans reviewers. The library copies are for reference only. Out-of-state companies or developers usually ask to review the local codes and ordinances (in many cases prior to a preconstruction meeting) to verify they are aware of all local requirements.

Books and Journals

Among the books available to code enforcement officials is the NFPA "Fire Protection Handbook." This particular book is now in its 17th edition; it is updated approximately every five years. The book is a resource on fire protection and fire prevention practices. Other NFPA handbooks include the "National Electrical Code Handbook," "Automatic Sprinkler Handbook," "Fire Alarm Signaling System Handbook," "Health Care Facilities," and the "Fuel Gas Code," which are designed to explain code requirements and help users apply them intelligently. These books are guides; they are not intended to replace the codes.

Many journals and magazines are useful for bureaus in developing their programs, code enforcement techniques, and code interpretations. The model building groups' publications are excellent resources for finding interpretations of both building and fire codes. These magazines should be filed chronologically and bound by the year for future reference.

Publications of Standards or Regulations

Code enforcement agencies need to be aware of the standards published by the ASTM, the API, and the ANSI. The ASTM develops and publishes standards for materials and standard tests of materials and assemblies. The ASTM standards, usually issued as tentative, are required to be reviewed periodically to determine if they should be made a standard. The API issues standards for storage and handling of flammable and combustible materials, tank construction and installation.

Also very important to every code enforcement official and all plans review personnel is the recent Americans with Disabilities Act (ADA). This law affects the accessibility of buildings for handicapped people. Code enforcement officials should be aware of the provisions of the ADA when examining buildings for the ease of evacuation or of defending in place (compartmentation, an area of rescue assistance, etc.).

The ANSI has two methods of establishing standards. The first is "existing standards" where the method is adopted by the ANSI but the standard has been produced previously by another company. The second is "sectional committee" where the ANSI acts as a correlating agency to determine "need" for a new standard, as there are "existing standards." Representatives of all agencies, or individuals who have an interest in developing a new standard, confer. When a consensus is reached, a special committee is formed to write the standard. The ANSI publishes numerous standards, but two used frequently address handicap provisions and elevator requirements. These work hand-in-hand with the building and fire codes.

Product manufacturers publish listings of materials and products that meet the various standards. These lists are excellent references for architects and engineers specifying a particular type of product. Some agencies require cut sheets, videos and pictures, and require that slides be submitted. These become part of the research section of the library.

Among the books that testing laboratories and manufacturers will supply to fire departments are "U.L. Fire Resistance Directory," "Intertek Listing Book," "The Gypsum Products Fire Resistance Design Manual," and "Factory Mutual." Of course there are many others. As you build your reference library, you will want to add any that are relevant to your department. One key point is not to "over collect." Get the ones you will use most in the plans review and inspection sections, then proceed from that point.

Reference Materials and Books on Hazards

Hazardous materials reference books are another vital part of the fire prevention bureau library. With the ever-increasing number of chemicals, it has become necessary to have books on hand to do the research necessary to conduct a thorough inspection. Departments must select books that will most benefit them. Some of the first books to review are the “Chemical Dictionary,” “Flammable and Combustible Liquid Code,” “DOT Handbook Guide,” and books on the handling, storing and manufacturing of hazardous materials. Also include copies of proposed code changes, which are an excellent tool for researching interpretations when questions arise as to the intent of the code.

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WAT

STAR SPRINKLER CORP
MODEL F
ALARM CHECK VALVE

VIKING
WATER
PRESSURE GAUGE

VIKING
WATER
PRESSURE GAUGE

MAIN DRAIN

31854
CITY POINT FIRE PROTECTION INC.
THIS AREA EQUIPPED WITH:
WET SYSTEM DELUGE VALVE
DRY SYSTEM WATE OF USE VALVE
ANTI-FREEZE THERMAL CONTROL VALVE
FIRE ACTION VALVE OTHER FIRE VALVE
VALVE SERIAL NO. 6 STAR F
INSTALLATION DATE 08/27/2014
INSPECTOR NAME [Signature]
NO. LOW POINTS TO BE DRAINED

NFPA

CS
15 ft
Fl. 2
1500
560
128
13 ft Custom

HYDRAULIC SYSTEM

THE MAKEOVER

A comprehensive reorganization of the 2019 NFPA 13 has resulted in a major standard that is a leaner, clearer, and more effective tool for the installation of sprinkler systems

by David Hague

A few years ago, as part of the preparation for the 2016 edition of NFPA 13, *Installation of Sprinkler Systems*, members of one of the standard's committees expressed concern over inconsistencies they had identified in the document. The standard had existed in one form or another since 1896, had undergone more than 60 revision cycles, and had grown to nearly 500 pages. Committee members realized that, in the process of all that change, some chapters had grown disproportionately large and had become difficult for users to manage and follow. Additionally, redundancies had crept into the standard, increasing its size without adding clarity. Committee members began discussing the possibility of restructuring the standard to address these issues.

The NFPA 13 Correlating Committee noted these concerns and established a task group to review the entire document and identify ways to clarify it and make it easier to use. The task group sought to remove redundancies that created confusion or conflict—repetition that improved usability was deemed appropriate, however—and to avoid repetition of general information throughout the standard. The flow of information was reviewed from chapter to chapter, with the idea of providing consistent chapter structures and combining, reordering, or dividing chapters where the flow was problematic. Chapter titles were checked for accuracy. The task group was charged with preparing a draft prior to the next revision cycle. ▶

The result of this effort is a major reorganization for the 2019 edition of NFPA 13. Information is now clearly separated by subject matter—sprinkler technology, storage method, commodity, and so on—and is organized in the order the information is needed for anyone planning a sprinkler system installation. (One of the first considerations when planning a sprinkler system, for example, is the available water supply. In the previous edition, water supply wasn't addressed until Chapter 24, so an engineer or designer had to constantly flip from front to back to reference the information. In the 2019 edition, water supply is addressed in Chapter 5.) The standard has been trimmed to about 400 pages. Overall, the 2019 edition offers users a clearer, more concise, and more effective tool for the installation of sprinkler systems.

Much of the work on the new NFPA 13 is already complete. First and second draft meetings were held, and the notice of intent to make a motion (NITMAM) closing date has passed with no NITMAMs submitted related to the standard's reorganization. NFPA 13 will be presented to NFPA's membership at the upcoming 2018 Technical Session in Las Vegas in June. It is anticipated that the 2019 edition of NFPA 13 will be published later this year with an effective date of sometime in August.

Early technologies

The changes to the 2019 edition of NFPA 13 were nearly three centuries in the making.

The first known water-based fire extinguishing system was installed in England around 1723 and consisted of a container of water, a chamber of gunpowder, and a system of fuses, the operational logic being that a fire would ignite the fuses that would detonate the gunpowder, and the ensuing explosion would release the stored water on the blaze. The first sprinkler system used in the United States was a network of perforated pipes that was used in the mid-1800s. As its name suggests, the pipes were perforated with holes drilled at strategic points along their lengths. The system had to

be activated manually and discharged throughout the area, not just over the fire—a rather inefficient method that wasted a lot of water. The first automatic sprinkler was invented in 1864, but it wasn't until 1878 when Henry Parmelee created an automatic sprinkler that saw extensive use.

In the late 1800s, sprinkler technology was advancing rapidly in the U.S.; in Boston alone, nine different sets of rules for the installation of sprinkler systems were in use. To address this issue, standardize installation, and prevent confusion surrounding different rules, a group of stakeholders, primarily insurance professionals, met in the Boston offices of the Underwriters Bureau of New England in 1895 to draft a set of uniform requirements for the installation of sprinkler systems.



AT-A-GLANCE HIGHLIGHTS OF THE NEW NFPA 13

- » The standard is now organized in the order the information is needed for planning a sprinkler system installation.
- » Information is now clearly separated by subject matter, such as sprinkler technology, storage method, and commodity.
- » Repetition of general information has been removed throughout the standard. The document has been reduced from nearly 500 pages to about 400.
- » Definitions of all terms used in NFPA 13, collected in Chapter 3, are now organized alphabetically rather than in groups by subject matter.
- » Chapter 4, General Requirements, has been revised to include general information needed in the planning and design of a sprinkler system.

The result was “Rules and Regulations of the National Board of Fire Underwriters for Sprinkler Equipments, Automatic and Open Systems,” published in 1896. The document was 25 pages long. “The Red Book,” as it came to be known, was the standard that led to the creation of NFPA 13, as well as NFPA itself, which was founded in 1896.

In 1897, Everett U. Crosby, NFPA's first secretary of the association, outlined the principles used in establishing the sprinkler standard, effectively describing the process that continues to be used to guide NFPA technical committees to this day. The purpose of the association, he wrote, was “to bring together the experience of different sections and different bodies of underwriters, to come to a mutual understanding, and, if possible, an agreement on general principles governing fire protection. Additionally, he wrote, the process existed “to harmonize and adjust our differences so that we may go before the public with uniform rules and conditions which may appeal to their judgment.”

In the 1960s, the NFPA 13 Technical Committee was charged with evolving the standard to encourage innovation and technology while keeping system installation costs in check. This was done with the intent of making systems available on a wider basis to further reduce fire loss. The effort resulted in the development of new types of pipe, fittings, and sprinklers, as well as the introduction of hydraulic calculations. In the 1980s and 1990s, sprinkler technology exploded with the introduction of the quick response sprinkler, early suppression fast response (ESFR) technology, control mode density area sprinklers, control mode specific application (CMSA) sprinklers, extended coverage sprinklers, and more, and NFPA 13 grew accordingly to address the plethora of new technologies.

Following the 1996 edition of NFPA 13, the technical committee was expanded to accommodate the need for additional technical expertise. The committee was organized into a technical correlating committee (TCC) that oversaw the entire project. The TCC

supervised the work of committees on hanging and bracing, sprinkler system discharge criteria, and sprinkler system installation. The Technical Committee on Private Water Supply Piping Systems, part of the organization of NFPA 24, *Installation of Private Fire Service Mains and their Appurtenances*, was added before the 2002 edition. The Technical Committee on Residential Sprinkler Systems—part of the organization of NFPA 13D, *Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, and NFPA 13R, *Installation of Sprinkler Systems in Low-Rise Residential Occupancies*—was added prior to the 2007 edition, as was the Technical Committee on Foam-Water Sprinkler and Foam-Water Spray Systems.

For the 1999 edition, the technical committee decided to include all sprinkler requirements in a significant reorganization of the standard. As part of that effort, language from approximately 40 NFPA codes and standards was added, including the entire text of all of the storage documents, including NFPA 231, *Indoor General Storage*, NFPA 231C, *Rack Storage of Materials*, NFPA 231D, *Storage of Rubber Tires*, NFPA 231E, *Recommended Practice for the Storage of Baled Cotton*, and NFPA 231F, *Storage of Roll Paper*.

Retooling a major standard

While the contemporary NFPA 13 was comprehensive, it was also due for a big-picture makeover.

As part of the reorganization of the 2019 edition of the standard, the task group developed a spreadsheet showing every section of NFPA 13 in detail. The spreadsheet contained more than 8,000 lines and was developed to help the task group keep track of every line of text in the standard. As part of the document's reorganization by subject matter, individual lines of text were moved to new locations throughout the standard. While deciding where to place those lines in the new format, almost 500 lines of redundant text were proposed (and accepted by the committees) for elimination. Chapters have been renumbered.

Chapter 1, Administration, and Chapter 2, Referenced Publications, remain essentially unchanged from the previous edition, although the former Section 4.1 Level of Protection was moved to Chapter 1. Chapter 3, Definitions, was rewritten to structure all the definitions of terms used in NFPA 13 alphabetically rather than in groups by subject matter. Feedback from users had indicated that it was difficult to find definitions in the current subject matter organization.

Chapter 4, General Requirements, was revised to include general information needed in the planning and design of a sprinkler system. The chapter begins with the expected level of protection as in previous editions, but now includes occupancy classification since that information is the primary step in determining the design and layout of a sprinkler system. Limitations on system size have also been moved to this chapter.

Chapter 5, Water Supplies, now contains water supply information that was previously located in Chapter 24; the task group felt that this information belonged in the front of the standard, since this is the first step in planning a sprinkler system. Chapter 6, Installation of Underground Piping, formerly Chapter 10, includes requirements for underground piping systems and logically follows water supplies.

Chapter 7, Requirements for System Components and Hardware (formerly Chapter 6), and Chapter 8, System Types and Requirements (formerly Chapter 7), are two of the few chapters that were renumbered and moved intact. The former Chapter 9, Hanging, Bracing and Restraint of System Piping, was divided into two chapters based on subject matter: Chapter 17, Installation Requirements for Hanging and Support of System Piping, and Chapter 18, Installation Requirements for Seismic Protection.

As indicated, Chapter 8 in the 2016 edition had become the resting place for a great deal of information that was not well organized. Users looking for installation requirements or combustible concealed space requirements were forced to wade through a lot of

information to find what they were looking for. The chapter was divided into several new chapters with an improved and more logical organization. For example, the new Chapter 9, Sprinkler Location Requirements, contains much of the introductory information contained in the former Chapter 8, while Chapters 10 through 15 contain installation requirements for individual types of sprinklers: Chapter 10 covers installation requirements for standard upright, pendent, and sidewall sprinklers; Chapter 11 covers installation requirements for extended-coverage upright, pendent, and sidewall spray sprinklers, and so on. Chapter 12 covers residential sprinklers, Chapter 13 covers CMSA sprinklers, Chapter 14 addresses ESFR sprinklers, and the new Chapter 15 covers installation requirements for special sprinklers.

Chapter 16, Installation of Piping, Valves and Appurtenances, is a compilation of former Chapters 6 and 8. Similarly, Chapter 19, Design Approaches, includes all or parts of Chapters 4, 8, 11, and 23 from the previous edition of NFPA 13.

CONFERENCE SESSIONS

NFPA 13–2019, Standard for the Installation of Sprinkler Systems: A New Format for the Standard That Started It All

Tuesday, June 12,
9:30–10:30 a.m.
Russell Leavitt, Telgian Corp.

NFPA 13–2019, Standard for the Installation of Sprinkler Systems: Changes

Tuesday, June 12,
3:30–4:30 p.m.
Robert Caputo, Fire & Life
Safety America

NFPA 13–2019: A Case Study for the Reorganization of a Major NFPA Standard

Wednesday, June 13, 2–3 p.m.
Russell Leavitt, Telgian Corp.;
Kenneth Linder, Swiss Re; Chad
Duffy and David Hague, NFPA

The new Chapter 20, General Requirements for Storage, is a renumbering exercise of the former Chapter 12, while the rest of the storage chapters (Chapters 21–25) have been completely revamped and are now organized by protection method: Chapter 21, Protection of High Piled Storage Using Control Mode Density Area (CMDA) Sprinklers; Chapter 22, CMSA Requirements for Storage Applications; Chapter 23, ESFR Sprinklers; Chapter 24, Alternative Designs; and Chapter 25, Protection of Rack Storage Using In-Rack Sprinklers, which has been reorganized into a rack storage chapter. This approach to determining protection of storage should make this task much easier and finding information much more efficient.

The remainder of the standard includes Chapter 26, Special Occupancy Requirements (formerly Chapter 22); Chapter 27, Plans and Calculations (formerly Chapter 23); Chapter 28, Systems Acceptance (formerly Chapter

25); Chapter 29, Existing System Modifications (including portions of the former Chapters 6, 8, and 27); Chapter 30, Marine Systems (formerly Chapter

Information is now clearly separated by subject matter—sprinkler technology, storage method, commodity, and so on—and is organized in the order the information is needed.

26); and Chapter 31, System Inspection, Testing and Maintenance (formerly Chapter 27).

Stakeholders ranging from users of the standard, technical committee

members, and NFPA staffers expressed concern over being able to find familiar information in the reorganized standard. If a user wanted to know where the requirements for sprinklers in electrical equipment rooms resided (formerly Section 8.15.11), where would they look? We prepared a road map for the new edition similar to the one created for the 1999 edition, when the storage information was added to NFPA 13. It remains uncertain where this information will be provided and in what format, but we are working to create useful guidance so that every section from the 2016 edition can be found and is accounted for in the 2019 edition. The technical committee and task group are confident that with regular use of the new NFPA 13, users will be able to find the information they need much more easily and in a more understandable way. 🗺️

DAVID HAGUE is principal fire protection engineer at NFPA.

“I now feel more comfortable living in this home. If my kids are home alone and something happens again, fire sprinklers would give them time to get out.”

— Michelle Allyn, lost her home to fire and rebuilt with fire sprinklers

Every home fire has a story.

Learn how these tragedies have altered the lives of fire survivors and how fire sprinklers may have altered the outcomes.

FireSprinklerInitiative.org/Faces



FACES OF FIRE
A CAMPAIGN OF NFPA'S FIRE SPRINKLER INITIATIVE



Photo: ©2016 Bob Handelman

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NFPA 13, 2022 EDITION

CHANGES TO SPRINKLER SYSTEM INSTALLATION (SSI) AND SPRINKLER SYSTEM DISCHARGE (SSD) CRITERIA

JOHN AUGUST DENHARDT, P.E., FSFPE & JOSHUA McDONALD, M.S., CFPS | AMERICAN FIRE SPRINKLER ASSOCIATION

It is time to start the discussion on the changes to NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2022 edition. Every three years or so, the standard is revised. Many public inputs and public comments were submitted and debated. This cycle produced a few refinements, clarifications, and changes. The SSI Technical Committee is responsible for Chapters 1, 2, 3, 10-16, 29, 30, and Annex F. The SSD Technical Committee is responsible for Chapters 3, 4, 5, and 19-28. This article will present four interesting changes and the reasoning and commentary behind them.

LOW/HIGH SUPERVISORY AIR

Low/high air pressure settings for a dry pipe system. For a dry pipe sprinkler system, the SSI technical committee provided a minimum setting for the low air pressure switch and a method to determine the high air pressure setting for the high air pressure switch. The new requirements will provide installers with information needed to set these switches appropriately. In addition, this information can be used to update the requirements in future editions of NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

NFPA 13 Reference: 8.2.6.7.2.1

Public Input number: 135

First revision number: 1039

New or Revised Language: *The low-pressure signal shall be set at a minimum of 5 psi (0.3 bar) above the calculated trip pressure of the dry pipe valve.*

Committee Statement: A dry pipe system with air pressure that is either too low or too high is at risk. If the air pressure is too low, the dry pipe valve could trip due to the continuing loss of air pressure or from a surge in pressure from the water supply. When the dry pipe valve trips, a water flow alarm signal will be initiated, the fire department will be dispatched, and the evacuation of the building takes place. During freezing conditions, the system will fill with water, freeze, and cause a system impairment and possible system damage. If the air pressure is too high, the dry pipe valve will be delayed in tripping in a fire event resulting in a longer water delivery time and possible spread of the fire beyond the system designed remote area. A low/high air pressure switch installed on the system side of the dry pipe valve can monitor the system air pressure and alert those responsible for the system maintenance of either condition that exists.

NFPA 13 Reference: 8.2.6.7.2.2

Public Input number: 135

First Revision number: 1039

New or Revised Language: *The high-pressure signal shall be set at 5 psi (0.3 bar) above the system air pressure specified in 8.2.6.7.1.*

Committee Statement: A dry pipe system with air pressure that is either too low or too high is at risk. If the air pressure is too low, the dry pipe valve could trip due to the continuing loss of air pressure or from a surge in pressure from the water supply. When the dry pipe valve trips, a water flow alarm signal will be initiated, the fire department will be dispatched, and the evacuation of the building takes place. During freezing conditions, the system will fill with water, freeze, and cause a system impairment and possible system damage. If the air pressure is too high, the dry pipe valve will be delayed in tripping in a fire event resulting in a longer water delivery time and possible spread of the fire beyond the system designed remote area. A low/high air pressure switch installed on the system side of the dry pipe valve can monitor the system air pressure and alert those responsible for the system maintenance of either condition that exists.

SMALL, ISOLATED, TEMPORARILY OCCUPIED ENCLOSURES

Is sprinkler protection required for small, isolated, temporarily occupied enclosures? In the marketplace, small hearing testing booths, lactation rooms, phone booths, and similar areas are being commonplace. The SSI technical committee addressed these areas. The last sentence of the technical committee statement (maximum 4-ft horizontal length) is not supported in the new text. I am not sure what was meant by the language, but I fully agree these small “isolated” rooms do not present a fire hazard.

NFPA 13 Reference: 9.2.10

Public Input number: 265

First Revision number: 1102

Second Revision number: 1062

New or Revised Language: *9.2.10 Small Temporarily Occupied Enclosures.*

9.2.10.1 Sprinklers shall not be required in small isolated temporarily occupied enclosures that do not extend to the ceiling.*

A.9.2.10.1 These isolated spaces are similar to hearing testing booths, lactation rooms, phone booths, or pods and are not used for storage. Miscellaneous furniture, wastebaskets, and other nonstorage items are allowed in the space. Isolated is intended to mean that units should not be located adjacent to each other and are physically separated.

9.2.10.2 The maximum area of the small temporarily occupied enclosures shall not exceed 24 ft² (2.2 m²), and storage shall not be permitted.

Committee Statement: The current NFPA 13 standard does not address small, occupied spaces, so some Authorities Having Jurisdiction (AHJs) require sprinkler protection because they are occupied spaces. They are usually installed in open office spaces, and bringing a pipe feeding a sprinkler in the booth from the ceiling sprinkler system is a problem for aesthetic reasons. Most of these booths are mobile, so once the sprinkler pipe is installed, they lose this feature. Some booths are required to be soundproofed and the pipe penetration for sprinkler installation could create a problem. Due to limited size (maximum 4-ft horizontal length) and sprinkler protection above, they do not increase fire hazard.

SINGLE POINT DENSITY

Single point densities and the elimination of the density curves for new systems have finally been accepted by the SSD technical committee. The density curves have now been limited to existing systems. AFSA's technical staff has supported this change for over 20 years.

NFPA 13 Reference: 19.2.3.1.1 and others

Public Input number: 125

First Revision number: 1334

New or Revised Language: This table shows the new single point density area options for the 2022 edition of NFPA 13:

Hazard	GPM/FT ² / FT ²
Light	0.1/1500 or 0.07/3000*
Ordinary Group 1	0.15/1500 or 0.12/3000*
Ordinary Group 2	0.2/1500 or 0.17/3000*
Extra Group 1	0.3/2500 or 0.28/3000*
Extra Group 2	0.4/2500 or 0.38/3000*

Committee Statement: In the development of the 2002 edition of NFPA 13, the proposal of single point densities (the elimination of the density curves) was approved by the technical committee but overturned at the annual meeting technical session. Multiple new orifice sizes have been introduced which eliminate the need to slide up curves to reduce operating pressures. Testing of Class III storage at Underwriters Laboratory have demonstrated the weakness of the curves as the area of operation gets larger (3,000 ft²). The curves were first developed in the late '60s to early '70s, using limited fire tests and K5.6/K8.0 sprinklers—they are not relative to the performance of larger K factors now required by NFPA 13 for higher densities. Higher initial starting pressures associated with larger design areas have also been called into question with additional testing of the K14 ESFR and K8.0 (all testing has been submitted to the committee over time).

Data from the development of the storage curves show us that there were no tests run for the 5 Class I curves, one test run for the 5 Class III curves, and no successful test (in today's criteria) for the Class 4 curves. The bulk of the testing was with Class II storage, and the assumption of "Parallelism" was adopted so limited testing could develop

like curves. This proposal does not eliminate the curves; it limits them to existing systems.

PHANTOM FLOW

The "Phantom Flow" calculation approach has been in the standard for several cycles. The language has changed slightly in each cycle in an attempt to clarify the approach. In this cycle, AFSA believes the SSD technical committee finally provided clear language with a diagram that works.

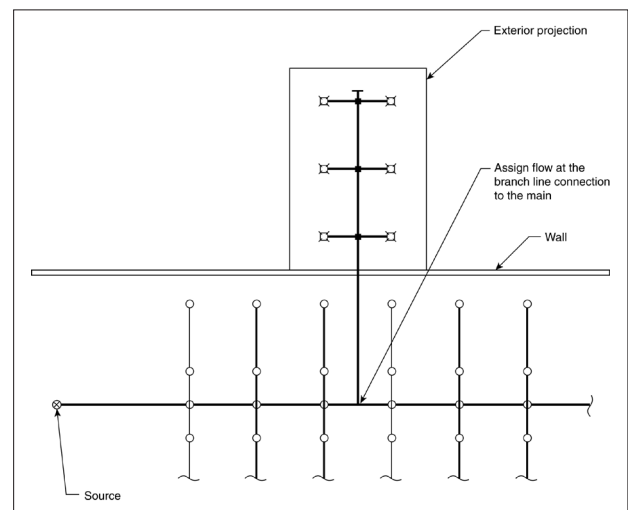
NFPA 13 Reference: 28.2.4.2.5*

Public Input number: 312

First Revision number: 1315

New or Revised Language: Where the total design discharge from the operating sprinklers is less than the minimum required discharge determined by multiplying the required design density times the required minimum design area, an additional flow shall be added at the point of common connection closest to the source to increase the overall demand, not including hose stream allowance, to the minimum required discharge.

The annex figure was revised to show that the added flow is assigned at the connection to the cross main:



Committee Statement: The current wording contradicts itself. The text states additional flow is being added at the point of connection of the branch line to the cross main. After that, it states to go the furthest from the source to add the additional flow. The point of connection would be closer to the source if it is the branch line connecting to the cross main, not further away. ■

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